

MARINE CORPS WARFIGHTING LABORATORY

MULTI-SENSOR CHANGE DETECTION technologies help detect Improvised Explosive Devices (IEDs) employed by insurgent fighters along transportation routes throughout deployed areas, while reducing false alarms and failed detections common in current detection technologies.

Background:

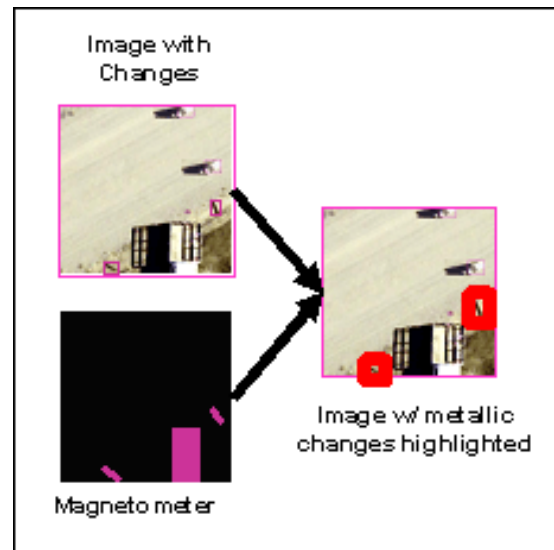
Since the start of Operation Enduring Freedom and Operation Iraqi Freedom, there has been a large increase in insurgent use of IEDs. Insurgents often target convoys and patrols with hidden IEDs alongside roadways. The requirement to detect IEDs was originally documented in Urgent Universal Needs Statement (UUNS) #05054UD. Efforts in FY05 with a single-sensor Change Detection system failed due to technical reasons, but also illustrated the ease in which IEDs could be camouflaged in ways that exploited a given sensor's weaknesses. Additionally, efforts conducted by the US Military commonly note high degrees of false alarms caused by limitations of the tested technologies as well as the large volume of clutter and trash commonly present in operational theaters. These issues have been noted as being particularly problematic with Change Detection approaches and have strongly contributed to limiting use of such technologies in operational theaters.

Description:

The Multi-Sensor Change Detection initiative conducted by MCWL in partnership with the Office of Naval Research (ONR) investigates approaches to overcome previously noted shortcomings in several ways:

1. Use of multiple sensors to compliment each other and mitigate the weaknesses of any single sensor.
2. Use of varying detection techniques, such as Anomaly Detection, to supplement Change Detection.
3. Use of data fusion to provide a unified view of the data from multiple sensors and techniques.
4. Exploitation of the multiple clues to characterize the nature of an object of interest and determine its threat potential.

MULTI-SENSOR CHANGE DETECTION *fact sheet*



Initial efforts are aimed at identifying and developing a sensor and processing architecture that exploits a set of IED characteristics that are difficult for insurgents to change without compromising the effectiveness of IED attacks. Subsequent steps are dependent on availability and maturity of gear and techniques suitable for the identified architecture, and could be at the lab development/demonstration level if mature technologies are not available.

Deliverable Product: The Multi-Sensor Change Detection initiative will at least provide an understanding of the utility of a multi-sensor approach in detecting and locating IEDs. If significant utility is indicated, a prototype system will be tested and potentially evaluated in an operational theater.

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